# RESEARCH ON ECONOMICS OF CEREALS IN KHUZISTAN*

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## Introduction

This report studies the importance of cereal production in Khuzistan and the causes of its variation throughout the last 35 years.

The study comprises:

1. An analytical study of the area under cultivation and the volume of production of cereals during the years 1926 - 1933 and 1957 - 1960, and a comparison between the two periods.

2. A calculation of the peasant's income from cereal production during the periods 1926 - 1933 and 1957 - 1960, as well as a study of the change over the period.

3. The determination of the area of cultivated and uncultivated lands, as well as the area of good potential agricultural soils which could be turned into cultivated areas and of the salt tracts incapable of improvement, thus determining the extent to which it would be possible to increase arable land.

4. A study of the climatic variations during the years under review.

5. A comparative study of cereal prices between 1926 and 1960.

Sources of information for these studies were:

1. Statistics of the Economic Department of the Ministry of Agriculture compiled from questionaires of the Agricultural Departments of the Ostans (provinces).

a. Agricultural statistics of districts for Khuzistan for the year 1957.

b. The prices of agricultural products for the years 1957, 1958 and 1960

c. The distribution of the product between the peasant and the landlord in various parts of the country.

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2. Statistics published by the Department General of Statistics for the years 1958 and 1960 ( as provided in the 1958 and 1960 year books of statistics, and information obtained direct from the Department General of Statistics.) Statistics for the areas under cultivation were obtained by sampling, and those for production by questionnaire.

3. Statistics extracted from tax returns of the Ministry of Finance for the years 1926 to 1933.

4. Publications of the Department General of water and Soil (mimeographed in 6 volumes) for the classification and analysis of the various soils in Khuzistan, as well as written views of Engineer Vakilian.

5. Publications of the Department General of Meteorology in respect of weather statistics.

The study is presentsd under the following heads:

1. The geographic position of Khuzistan.
2. Climatic variations.
3. Boundary variations.
4. Soil.
5. Labour and source of energy (agricultural labour and ox-power).
6. The distribution of the Product between the peasant and the landlord—the peasant's income.
7. The combination of factors in cereal production.
8. The development of cereal production in Khuzistan during the last 35 years.



**The Geographic Position of Khuzistan**

The land called Khuzistan in this study has an area of around 67,588 square kilometers and extends to Luristan and Pusht-i-Kuh in the north, Iraq in the west, persian Gulf in the south, Fars and Bakhtiari in the east and north-east respectively.

The area is situated between 30° to 33° north of the equator and comprises the Ahwaz, Khorramshahr, Abadan, Ramhormoz, Shushtar, Dizful, Behbehan-Kuhgiloyeh, Dasht Mishan and Masjid-i-Suleiman districts. The rivers Karun, Karkheh, Dez, Bahmanshir and Jarahi flow through the area and provide water for its irrigation.

**Boundary Variations**

Like all other ostans (provinces) in Iran, Khuzistan has had a number of changes in its administrative division resulting in the cession of parts of its area and their inclusion successively with Fars and Bakhtiari.

Similar alteration in the administrative divisions of the various districts, too, have occurred frequently. The latest of these changes was during the last 5 years when the villages around Izeh which were parts of Dezful, Ramhormoz and Masjid-i-Suleiman districts were transferred to the Bakhtiari in the 1960 statistics of the Department General of Statistics. These alterations make it very difficult to reconcile conflicting statistics compiled by different government oraganizations and to make meaningful comparisons.

Apart from these difficulties, there were many deficiencies in the 1926-1933 tax returns for Khuzistan. For example no returns at all for certain villages in the Ahwaz, Abadan and Khorramshahr districts could be traced; in other cases the returns were incomplete.

It will therefore be readily seen that the area of Khuzistan has varied appreciably between the years 1926, and 1960. Thus the compartive study of statistics between different periods is vitiated because not only have the area and population changed, but in some cases tax returns too are incomplete.

To overcome these deficiencies it was decided:

1. To include for the 1926 statistics only those villages for which tax returns are available and which are currently included administratively as part of Khuzistan. Such villages, called in the study «sample villages» exist only for the 4 districts of Dezful, Shushtar, Ramhormoz and Behbehan-Kuhkiloyeh. Thus the study of variations must be confined to these four districts.

2. To utilize calculated agricultural statistics from census statistics for villages in Khuzistan. This is because it is not known what ratio the number of villages, for which tax returns for the years 1926-1933 are available, bears to the total number of villages existing in those years. Since it is known that the area under cultivation of each village is functionally related to the population of the village this procedure can be applied for the esti-

mation of the area under cultivation without undue loss of accuracy. 1

The study utilized the following statistics of the Meteorlogical Office:

| | | | | |
|---|---|---|---|---|
| Ahwaz | statistics | for | 18 | years |
| Abadan | « | « | 19 | « |
| Behbehan | « | « | 10 | « |
| Gatch Saran | « | « | 7 | « |
| Shushtar | « | « | 10 | « |
| Dezful | « | « | 10 | « |
| Masjid-i-Suleiman | « | « | 16 | « |
| Agha-Jari | « | « | 9 | « |

Table No. I shows total annual precipitation at each centre for each of the districts in Khuzistan during the period 1941 - 1960.

1. Estimation of agricultural production from population is based on scientifically proved methods, as given in Cokrân, «Sampling Technique», New york, 1953,chap.6. A short description of the method applied in the study is given in Section 5 .

Table 1 - Total Annual Precipitation in Khuzistan Districts
(figures in millimeters)

| Year | Abadan | MIS* | Aghajari | Gatch Saran | Behbehan | Dezful | Shushtar | Ahwaz |
|---|---|---|---|---|---|---|---|---|
| 1941 | 195 | 345 | – | – | – | – | – | – |
| 1942 | — | 395 | – | – | – | – | – | 188 |
| 1943 | 203 | 535 | – | – | – | – | – | 234 |
| 1944 | 124 | 320 | – | – | – | – | – | 192 |
| 1945 | 258 | 457 | – | – | – | – | – | 208 |
| 1946 | 240 | 545 | – | – | – | – | – | 373 |
| 1947 | 143 | 333 | – | – | – | – | – | 221 |
| 1948 | 150 | 514 | 265 | 366 | – | – | – | 185 |
| 1949 | 164 | 520 | 310 | 458 | – | – | – | 196 |
| 1950 | 138 | 429 | 231 | 400 | – | – | – | 161 |
| 1951 | 131 | 533 | 415 | 463 | 267 | 250 | 294 | 129 |
| 1952 | 148 | 424 | 381 | 308 | 351 | 432 | 433 | – |
| 1953 | 145 | 425 | 247 | 197 | 320 | 568 | 357 | 181 |
| 1954 | 321 | 537 | 419 | 245 | 577 | 487 | 445 | 339 |
| 1955 | 113 | 265 | 278 | – | 286 | 239 | 156 | 171 |
| 1956 | 94 | 384 | 347 | – | 290 | 235 | 254 | 122 |
| 1957 | 168 | – | – | – | 369 | 459 | 462 | 276 |
| 1958 | 80 | – | – | – | 254 | 285 | 270 | 134 |
| 1959 | 132 | – | – | – | 153 | 181 | 171 | 120 |
| 1960 | 85 | – | – | – | 199 | 392 | 364 | 116 |
| Average | 158 | 435 | 321 | 348 | 306 | 353 | 320 | 197 |
| No. of years | 19 | 16 | 9 | | 10 | 10 | 10 | 18 |

*Masjid-i-Soleiman

Source : Meteorological Office.

It will be seen from the table that as regards precipitation Khuzistan comprises two regions :

Region I : Ahwaz, Khorramshahr, Abadan and South Behbehan, 150 200 mm. of total annual precipitation.

Region II : Dezful, Gatch Saran, Shushtar, Agha Jari, Masjid-Soleiman, North Behbehan/Kuhkiloyeh, 350 - 400 mm. of total annual precipitation.

Further study of the table reveals that :

**I. In the first region**

a. If the three exceptional years of 1945, 1953 and 1956 in the Ahwaz area are excluded the total annual precipitation has been around 170 mm., but if these three years are also taken into account the average precipitation increases to 197 mm.

b. Annual precipitation appears to be progressively reducing: during the past 18 years it has decreased from 188 mm. in 1941 to 116 mm. in 1959. The same phenomenon appears to be at work in the case of Abadan. This decrease in precipitation has affected dry farming in this region to a marked degree.

c. It is generally agreed throughout the world that dry farming can only be carried on if there is around 300 mm. of annual precipitation.

In Khuzistan, dry farming is practiced in regions where the total annual precipitation is even less than 150 mm., yielding something like 400-450 kgms. per hectare (provided no prolonged drought occurs during the period between the sprouting of the seed and the ripening of the grain.) This may be due to the high temperature which prevents winter hibernation and enables the plant to benefit throughout from winter rainfall for growth.

Charts 1 and 2 showing precipitation in the dry farming regions of Ahwaz and Zanjan are reproduced to explain the matter further.

It is seen from Chart 1 that in the Ahwaz region the temperature is above 6° C, throughout the whole of the growth period for wheat from

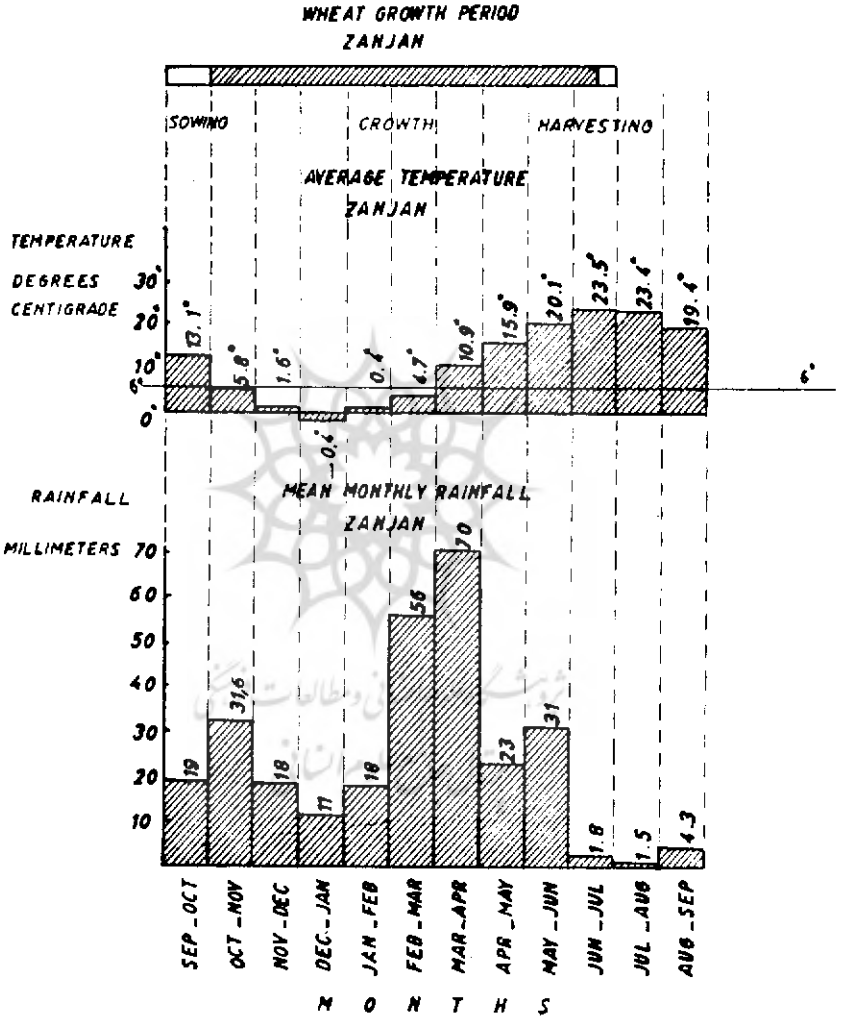


CHART No.1_WHEAT GROWTH PERIOD, AVERAGE TEMPE_RATURE AND MEAN MONTHLY RAINFALL IN THE ZANJAN DISTRICT

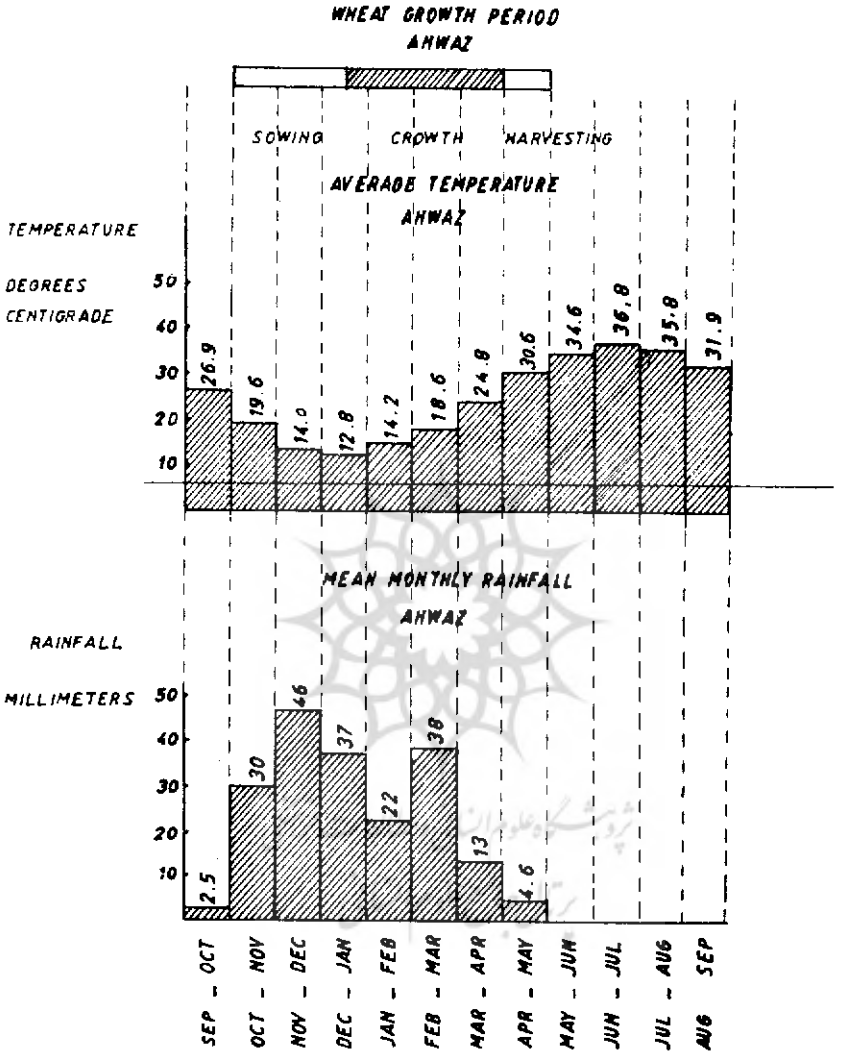


CHART No. 2 _ WHEAT GROWTH PERIOD, AVERAGE TEMPERATURE AND MEAN MONTHLY RAINFALL IN THE AHWAZ DISTRICT

sowing to harvesting, and that as a result of the absence of winter hibernation the plant utilizes all precipitations for growth. By contrast in the Zanjan region the seedling is hibernating throughout the period November to March when the average temperature is generally below 6° C. and thus cannot benefit from some 134 mm. of precipitations during this period which are wasted, and has to make do with the remaining 145 mm. falling outside of this period. If dry farming were carried on in a scientific way, even this 145 mm. could be stored in the sub-soil for subsequent utilization by capillary action during the dry season. But this is not the case in practice because :

1. Farming in Iran is not undertaken in a scientific manner.
2. It has been proved that during the months of winter and early spring, owing to the excessive moisture in the soil, a part of the moisture drains down to the lower strata and into the underground waters and what remains can be of use only during the relatively short period of 15 to 20 days after the rains cease. After this period the water table is too low for capillary attraction to be effective. Thus of the total of 280 mm. annual precipitation in the Zanjan region only 145 mm. actually benefits dry farmed wheat, which is roughly the same minimum required by the Ahwaz region .

**II. In the second region**

a. This region, with a total annual precipitation of 353 mm. for Dezful, 320 mm. for Shushtar, 321 mm. for Agha Jari, 348 mm. for Gatch Saran and no less than 435 mm. for Masjid-i-Soleiman, is very well suited for dry farming. Besides, statistics compiled from meteorological records show that the mean temperature during the whole of the period from sowing to harvesting is such that the plant can benefit from soil moisture throughout and continue its growth .

b. Unlike the first region there has been no diminution in the amount of precipitation in the second region during the years under review.

c. As can be seen from Tables 2 and 3 :

1. The ratio of the area under dry farming to the total area under cultivation works out to 57% in the first region and 48% in the second region. This would appear to demonstrate that the lack of adequate precipitation has not affected the extent of dry farming in the first region.

2. Agricultural yield was higher in the second region (which has a greater precipitation) than in the first region. This shows that greater precipitation affects the yield not only of dry farming but of irrigated farming as well. The 1960 statistics of the Department General of Statistics show a wide divergence between the yield per hectare in the two regions—in fact, the second region is shown as having twice the yield per hectare of that of the first region, but the Ministry of Agriculture statistics for the year 1957 reduces the disparity.

Obviously statistics for the two years do not permit of conclusive results and it will be necessary to have statistics for the years 1958 and 1961 before a more meaningful conclusion can be reached.

**Soil**

Khuzistan soils have been tested and classified by the Department General of Water and Soil with the co-operation of soil experts of the F.A.O. and Iranian technicians. Twelve classes have been differentiated, which we divide here in three main groups, in the order of arability:

**1. Arable Soils**

Some 26158 square kilometers, or 39% of the total area of Khuzistan, consist of good arable land. According to statistics it appears that only about 8000 square kilometers, or between $\frac{1}{3}$ and $\frac{1}{4}$ of the arable land is currently under cultivation.

Table 2– Cereal Production in Khuzistan (Region I)

| | | Abadan/Khoramshahr | Ahwaz | Dasht Mishan | Ramhormoz | Total |
|---|---|---|---|---|---|---|
| **Wheat and Barley (Irrigated)** | | | | | | |
| 1960: Area under cultivation | (hect.) | 10,300 | 53,386 | 23,842 | 5,618 | 93,146 |
| Product | (tons) | 3,236 | 47,137 | 15,496 | 4,919 | 70,788 |
| Yield | (kgs./hect) | | | | | 760 |
| 1957: Area under cultivation | (hect.) | 2,955 | 58,000 | 7,860 | 6,000 | 74,815 |
| Product | (tons.) | 1,599 | 45,600 | 7,110 | 4,900 | 59,209 |
| Yield | (kgs./hect.) | | | | | 791 |
| **wheat and Barley (Dry)** | | | | | | |
| 1960: Area under cultivation | (hect.) | 66,338 | 66,937 | 7,260 | 3,097 | 143,632 |
| Product | (tons) | 16,740 | 24,499 | 1,416 | – | 42655 |
| Yield | (kgs./hect.) | | | | | 297 |
| 1957: Area under cultivatidn | (hect.) | 34,800 | 55,000 | 11,040 | 150,000 | 115,840 |
| Product | (tons) | 21,880 | 34,000 | 6,550 | 11,200 | 73,630 |
| Yield | (kgs./hect.) | | | | | 636 |
| **Rice** | | | | | | |
| 1960: Area under cultivation | (hect.) | — | 3,022 | 5,884 | 394 | 9,300 |
| Product | (tons) | — | 2,432 | 1,190 | 135 | 3,757 |
| Yield | (kgs./hect.) | | | | | 404 |
| 1957: Area under cultivation | (hect.) | 7,440 | 500 | 6,400 | 3,500 | 17,840 |
| Product | (tons) | 8,289 | 700 | 9,000 | 5,200 | 23,189 |
| Yield | (kgs./hect.) | | | | | 1,300 |
| **Average Yield (1960 and 1957)** | | | | | | |
| Wheat and Barley (Irrig.) | kgs./hect. | | | | | 774 |
| » (Dry) | » | | | | | 448 |
| Rice | » | | | | | 985 |
| Percentage of Total Area Under Cereal Cultivation Utilized for Dry Farming | | | | | | 57% |

Source : 1960 – Department General of Statistics

**Wheat and Barley (Irrigated)**

| | Dezful | Shushtar | Behbehan/Kuh Kiloyeh | MIS* | Total |
|---|---|---|---|---|---|
| 1960: Area under cultivation(hect.) | 46,487 | 4,867 | 10,800 | — | 62,154 |
| Product (tons) | 34,874 | 4,004 | 14,660 | — | 53,538 |
| Yield (kgs./hect.) | | | | | 861 |
| 1957: Area under cultivation (hect.) | 64,400 | 18,000 | 26,200 | — | 108,600 |
| Product (tons) | 50,300 | 15,700 | 19,070 | — | 85,070 |
| Yield (kgs./hect.) | | | | | 783 |

**Wheat and Barley (Dry)**

| | | | | | |
|---|---|---|---|---|---|
| 1960: Area under cultivation (hect.) | 4,824 | 21,036 | 32,703 | 8,603 | 67,166 |
| Product (tons) | 328 | 5,698 | 28,749 | 2,492 | 37,267 |
| Yield (kgs./hect.) | | | | | 555 |
| 1957: Area under cultivation (hect) | 30,600 | 41,000 | 31,500 | 12,000 | 115,100 |
| Product (tons) | 21,050 | 22,070 | 18,500 | 7,250 | 68,870 |
| Yield (kgs./hect.) | | | | | 598 |

**Rice**

| | | | | | |
|---|---|---|---|---|---|
| 1960: Area under cultivation (hect.) | 9,747 | 1,077 | 2,089 | — | 12,913 |
| Product (tons) | 11,943 | 1,635 | 3,814 | — | 17.392 |
| Yield (kgs./hect) | | | | | 1,347 |
| 1957: Area under cultivation (hect.) | 9,600 | 1,000 | 3,950 | — | 14,550 |
| Product (tons) | 19,000 | 1,500 | 5,380 | — | 25,880 |
| Yield (kgs./hect.) | | | | | 1,779 |

**Average Yield (1960 and 1957)**

| | |
|---|---|
| Wheat and Barley (Irrig.)kgs./hect. | 812 |
| » (Dry) » | 582 |
| Rice » | 576 |
| Percentage of Total Area Under Cultivation Utilized for Dry Farming | 48% |

*Masjid-i-Soleiman

Source : 1960 - Department General of Statistics.

1957 - Ministry of Agiculture.

This is very likely due to non-utilizability of river water, lack of capital and other socio-economic causes.

**2. Semi-Arable Soils**

These cover some 3174 square kilometers or 4.7% of the total area of Khuzistan. Owing to the existence of various soluble salts (ranging from 0.15% to 0.65%) these soils are salty and great care must be exercised when irrigating such soils as they tend to turn into salt patches useless for agriculture if irrigated with hard water or under inexpert supervision. At present these soils can support plants which are resistant to salt.

**3. Non-Arable Soils**

These cover 37,549 square kilometers or around 55% of the total area of Khuzistan.

Such soils, covering more than half the area of Khuzistan, are of no use at all for agriculture due to their high contents of soluble salts (over 0.65%), or to the presence of excessive chalk and salt. Owing to geological causes, and the fact that at some time or another parts of these areas have been submerged under sea water, or as a result of unsuitable irrigation with water containing undesirable soluble minerals, coupled with low permeability of the soil and lack of proper natural drainage, salt incrustation in these soils has set in and rendered them completely useless.

In so far as the total area of arable land is concerned Khuzistan districts can be classified as follows.

| District | Arable and Semi-arable Land |
|---|---|
| 1. Behbehan / Kuhkiloyeh | 13,435 square kilometers |
| 2. Dezful | 5,202 » |
| 3, Dashi Mishan (Susangerd) | 3,411 » |

| | | |
|---|---|---|
| 4. Ahwaz & Ramhormoz | 2,874 | square kilometers |
| 5. Abadan & Khorramshahr | 2,012 | » |
| 6. Shushtar | 1,424 | » |
| 7. Masjid-i-Soleiman | 974 | » |

However, if the ratio of land actually under cultivation to total arable land is the criterion, a different picture appears, as shown below:

| District | Percent of Total Arable Land Presently under Cultivation |
|---|---|
| 1. Ahwaz & Ramhormoz | 92 |
| 2, Abadan & Khorramshahr | 77 |
| 3. Shushtar | 39·7 |
| 4. Dezful | 24.4 |
| 5. Dasht Mishan | 21.6 |
| 6. Masjid-i-Soleiman | 17.6 |
| 7. Behbehan / Kuhkiloyeh | 7·4 |

As to the reasons for these differences it would appear that one reason why such districts as Ahwaz and Abadan have a higher proportion of their arable land under cultivation is the existence of greater possibilities of river irrigation; in the case of Shushtar and Dezful the greater amount of precipitation is probably a more important cause. The causes of low utilization of arable land in Kuhkiloyeh and Behbehan can probably be attributed to difficulties of irrigation, whilst socio-economic reasons account for the inadequate utilization of arable land in the Masjid-i-Soleiman district.

**Soil Productivity**

Normally it should be possible to rank soil productivity by reference to the respective yields per hectare. But as rainfall plays such an important part in dry farming it was decided to exclude dry farming altogether and to take into account only the statistics relating to irregated farming. The study reveals that for the two regions together average yields for irrigated farming for the years 1957 and 1960 were:

Dry Region ( Ahwaz, Dasht Mishan, Abadan and Khorramshaher ) :

774 Kgms. per hectare for wheat and barley

993 « « rice

Medium Rainfall Region ( Dezful, Masjid-i-Soleiman, Shushtar, Behbehan-Kuhkiloyeh) :

812 Kgms. per hectare for wheat and barley
1576 « « rice

Thus, it would appear that the soil is more productive in the second region than in the first, but again one must take into account the effect of the higher rainfall in the second region.

Unfortunately owing to lack of records it is not possible to compare the yields per hectare of the first region as between 1960 and 1926. But for the second region, where records are available for both dates, the following figures are noted :

| | | |
|---|---|---|
| Irrigated wheat and harley | 1098 kgm./hect. | 812 kgms./hect. |
| Rice | 3416 « | 1576 « |

This shows that yields per hectare have fallen a good deal over the last 35 years - 26% in the case of wheat and barley and 53% in the case of rice.

It is very likely that the reason for this fall in yields per - hectare is increasing salt incursion as a result of salinity of the irrigated water and the accumulation of a greater proportion of salt in the top-soil from the sub-soil, due to careless irrigation methods.

**Labour and Energy Sources**

Labour is provided by the peasant population; energy by animals, mainly oxen.

Soil preparation, irrigation, sowing and harvesting are all done by the peasant aided by animal power and such farm implements as the plough, the trowel, etc.

Experience elsewhere has shown that the peasant population is directly proportional to the area under cultivation. Statistics of villages for which a census was taken in 1926 by the Ministry of Finance, as well as those compiled by the Department General of Statistics for the years 1958 and 1960 definitely corroborate this functional relationship.

This relationship has been established in the case of Khuzistan as follows :

1. A total of 266 villages were ranked in accordance with population and divided into classes and entered in Table 4 together with class mid-point values, frequency and respective average area under cultivation.

Table 4- Array of 266 Villages in Khuzistan In Order of Population and Average Area under Cultivation

| ClassLimits | Class Mid-Point Population | Frequency | Average Area Under Cultivation (hectares) |
|---|---|---|---|
| 12-24 | 18 | 7 | 30.6 |
| 25-36 | 30 | 11 | 52.2 |
| 40-49 | 45 | 18 | 61.0 |
| 50-69 | 55 | 16 | 39.3 |
| 70-79 | 75 | 17 | 133.7 |
| 80-99 | 90 | 28 | 61.7 |
| 100-119 | 110 | 21 | 171.6 |
| 120-149 | 135 | 29 | 134.7 |
| 150-200 | 175 | 31 | 137.5 |
| 200-249 | 220 | 21 | 172.4 |
| 251-293 | 272 | 17 | 213.3 |
| 301-349 | 325 | 13 | 462.9 |
| 354-396 | 375 | 8 | 196.6 |
| 401-499 | 450 | 13 | 305.0 |
| 512-586 | 549 | 7 | 171.7 |
| 670-674 | 672 | 2 | 345.8 |
| 715-723 | 719 | 2 | 665.5 |
| 873-909 | 891 | 3 | 185.0 |
| 1700 | 1700 | 1 | 2000.0 |
| 4014 | 4014 | 1 | 353.0 |
| Total | | 266 | |

2. A scatter diagram was plotted on logarithmic paper for the class mid-point populations and average areas under cultivation (see chart No.3)

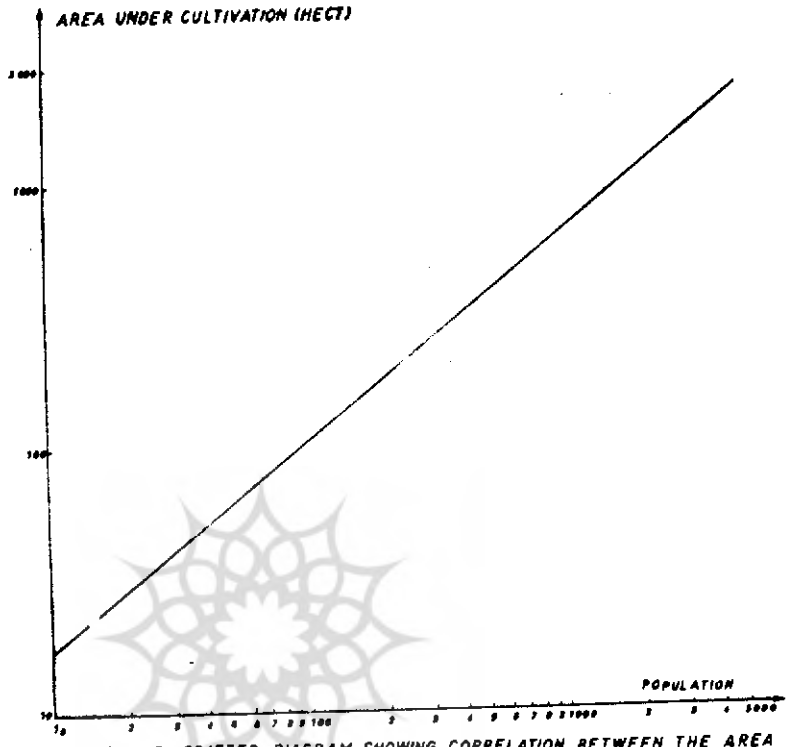


CHART No. 3 – SCATTER DIAGRAM SHOWING CORRELATION BETWEEN THE AREA UNDER CULTIVATION OF VILLAGES IN KHUZESTAN AND THEIR RESPECTIVE POPULATIONS

3. The line of best fit for the plotted points was found to be a straight line, corroborating the existence of a direct relationship between the logarithms of population and of area under cultivation.

4. This functional relationship was found to be—

$$\log y = 0.605 + 0.705 \log x$$

where x is the population and y is the area under cultivation in hectares.

5. The equation showing the direct relationship between x and y becomes

$$y = 4.027 \; x^{0.705}$$

6. On the basis of the above equation Table 5 and chart No.4 were prepared from which it is possible to read the area under cultivation for a known population either directly or by interpolation.

This relationship is found in practice to be true in the case of all the Khuzistan districts for which statistics of area under cultivation and population are available except in the case of Behbehan for the 1960 statistics where an increase in population had not brought about a commensurate increase in the area under cultivation.

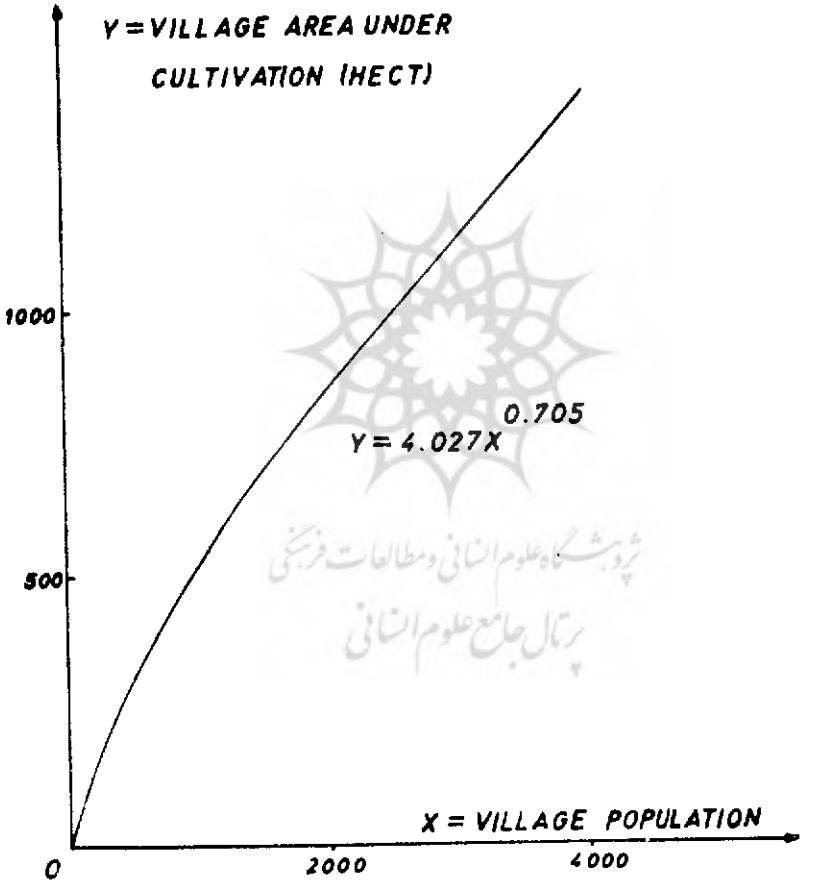


CHART NO. 4 – AREA UNDER CULTIVATION OF KHUZESTAN VILLAGES AS A FUNCTION OF THEIR POPULATION

Table 5- Area under Cultivation and Population for Khuzistan Villages in 1926

| Population | Area under Cultivation (in hectares) |
|---|---|
| 10 | 16 |
| 20 | 25 |
| 30 | 40 |
| 50 | 60 |
| 75 | 85 |
| 100 | 104 |
| 200 | 169 |
| 300 | 222 |
| 400 | 270 |
| 500 | 322 |
| 600 | 364 |
| 700 | 410 |
| 800 | 454 |
| 900 | 505 |
| 1000 | 525 |
| 1200 | 610 |
| 1400 | 670 |
| 1600 | 731 |
| 1800 | 795 |
| 2000 | 855 |
| 2500 | 994 |
| 3000 | 1138 |
| 3500 | 1265 |
| 4000 | 1395 |

The work unit is a pair of peasants working with a pair of oxen and the area that this unit can cultivate is called a «khish» (plough) in Khuzistan.

The plough itself is drawn by oxen, donkeys or horses. The area of a khish varies in different parts of Khuzistan. Table 6 gives the areas as calculated from statistics of the years 1926-1933 and 1960 for different places in Khuzistan.

It is seen that though there are differences between the figures for the various districts of Dezful, Shushtar, Ramhormoz and Behbehan/Kuhkiloyeh for the two periods, yet the figures for the four districts do not show much difference between 1926 and 1960. Thus the average area of a khish for wheat, barley and rice for all the four districts taken together was 5.31 hectares in 1926-33 and 6.86 hectares in 1960. This increase is probably due to the greater prevalence of mechanical farm implements during recent years.

Another observation is that the area of the khish may have varied according to the extent of use that is made of horses and mules as draught animals. Thus in Dezful, where 54% of draught animals is comprised of horses or mules, the area of a khish is 16.16 hectares; in Shushtar, with 46% horses it is 13.48 while in Behbehan and Ramhormoz districts where mules and horses are not used at all for the plough, the area of a khish is only around 4 hectares.

These differences in the area of the khish have resulted in two types of khishes becoming known in Khuzistan: the small khish of 4 hectares for ox-drawn teams and the large khish of around 16 hectares for horse-drawn teams.

**The Distribution of the Product**

The factors of production in Iranian agriculture are:

Land

Water

Labour

Ox (power)

Seed

Land and water are provided by the landlord; seed and oxen may be provided by the landlord, the purveyor (gavband) or the farmer. When the farmer supplies only his labour he receives only the share due to labour and is then a peasant.

Table 6-Khish Area in Khuzistan districts

1926-1933 and 1960

| 1960 | Dezful | shushtar | Beh/kuh | Ramhormoz | Average (4 districts) |
|---|---|---|---|---|---|
| Wheat and Barley (Irrig.) | 11.78 | 2.14 | 0.88 | 2.27 | |
| « « (Dry) | 1.21 | 9.28 | 2.69 | 1.25 | |
| Rice | 2.47 | 0.47 | 0.17 | 0.16 | |
| Total Khish Area | 15.47 | 11.89 | 3.74 | 3.68 | 6.86 |
| **1926-1933** | | | | | |
| Wheat and Barley (Irrig.) | 4.49 | 1.04 | 1.50 | 1.25 | |
| « « (Dry) | 0.16 | 9.86 | 2.44 | 1.82 | |
| Rice | 0.60 | 0.13 | 0.42 | 0.19 | |
| Total Khish Area | 5.25 | 11.0 | 4.36 | 3.26 | 5.31 |

Source: For 1960 data, Statistics of the Department General of Statistics for various districts ; for 1926 - 1933 data, Ministry of Finance tax returns .

Under these conditions whoever supplies the other two factors (i. e. seed and oxen) receives their respective shares from the joint product. When the peasant also supplies seed and oxen then he is a farmer and receives appropriate share .

In this study the income of a farmer who has one ox and provides his own seed has been taken as standard and the gross income of such a farmer, which is defined as the gross income of a half-khish in Khuzistan, has been used as basis of calculations.

In the interest of clarity the following definitions may not he out of place :

**Landlord** . a person who owns land and water and who generally does not interfere in the technical operations of agriculture and in effect receives interest on his capital.

**Gavband** (purveyor) an agent who supplies oxen and seed as well as management; he does not personally do agricultural work but ensures that the services required of him are provided.

**Peasant** a person whose only contribution to agricultural production is his labour; he owns neither oxen nor seed and receives his technical instructions from the gavband.

**Fermer** a person who puts up his own oxen and seed as well as management and labour; in effect he combines the functions of the peasant and the gavband.

As can be expected there is no uniformity in the distribution of the product between the respective factors of production throughout Khuzistan and each area has its own distinctive basis of sharing. The following observations are, however, noteworthy:

a. The basis of distribution is in general equal sharing between the five factors, viz., land, water, seed, ox and labour. But lack of security and confidence have modified the general rule considerably.

b. In some regions the landlord, who has little confidence in the other agents, insists on receiving a fixed share.

c. In certain parts of Khuzistan the peasant is under the control of the sheikh. These sheikhs, though without land and water, yet claim certain land rights and by providing seed and oxen impose themselves upon the peasant (who is generally a member of their tribe) and on the landlord and thus take the gavband's share of the product. Some sheikhs in the Shadegan public domain (khalesjat), even though they do not supply oxen, yet partake of half the product in return for supplying half the seed required by the peasant and promising to hand over the government's share as owner of the land water.

### Combination of Factors in Cereal Production

It is seen that the total product is directly proportional firstly to the area under cultivation and yield per hectare and secondly to other factors (natural, economic and social).

For the study of the area under cultivation and yield per hectare, as well as the area of a khish and the farmer's income the statistics for the

years 1958 and 1960 of the Department General of Statistics and the statistics of the Ministry of Agriculture for the year 1957 were used.

It should be noted that due to various administrative changes as between different districts it was necessary to make adjustments so as to make the respective figures comparable. Use was made of the population area under cultivation relationship (already mentioned) by multiplying the number representing the ratio of the 1960 population of each area to the population for the years 1957 and 1958 by each of the figures given in the statistics. Having thus adjusted the statistics, a mean of the three sets was calculated in respect of the following (vide Table No. 7):

Table 7 - Farm income in Khuzistan

| | 1960 | 1958 | 1957 | |
|---|---|---|---|---|
| | Dept. Gen. of Stat. | Dept. Gen. of Stat. | Ministry of Agri. | Average |
| Multiplier | 1 | 0.797924 | 1.097814 | |
| Population | 622,536 | 622,536 | 622,536 | 622,536 |
| No. of Khish | 58,803 | 65,477 | 51,611 | 58,630 |
| **Area Under Cultivation (in hectares)** | | | | |
| Wheat | 285,872 | 379,083 | 367,405 | 344,119 |
| Barley | 81,009 | 116,998 | 87,479 | 95,160 |
| Rice | 22,473 | 11,012 | 35,558 | 23,014 |
| Total | 389,354 | 507,088 | 490,442 | 462,293 |
| **Production (in tons)** | | | | |
| Wheat | 128,911 | 93,502 | 260,503 | 160,971 |
| Barley | 42,301 | 30,517 | 54,324 | 42,380 |
| Rice | 21,297 | 20,438 | 53,868 | 31,867 |
| Total | 192,509 | 144,457 | 368,695 | 235,218 |

| | 1960 | 1958 | 1957 | Average |
|---|---|---|---|---|
| **Yield per hectare (in kgms.)** | | | | |
| Wheat and Barley | 686 | 417 | 786 | 668 |
| Dry Farmed wheat & Barley | 301 | 204 | 617 | 350 |
| Rice | 947 | 1,855 | 1,514 | 1,384 |
| **Khish area (in hectares)** | | | | |
| Wheat and Barley | 2.64 | 1.61 | 3.90 | 2.64 |
| Dry Farmed wheat & Barley | 3.58 | 5.95 | 4.91 | 4.85 |
| Rice | 0.38 | 0.16 | 0.68 | 0.39 |
| Other | 0.16 | 0.18 | 1.15 | – |
| Total | 6.77 | 7.90 | 10.64 | 7.88 |
| **Farmer's Income in kind (in kgm)** | | | | |
| Wheat | 876.8 | 571.2 | 2018.5 | 1098 |
| Barley | 287.7 | 186.4 | 421.0 | 289 |
| Rice | 120.7 | 104.0 | 347.5 | 181 |
| Total | 1285.2 | 861.6 | 2787.0 | 1568 |
| **Farmer's income from other products ( in kgm )** | | | | |
| Pulses | 4.09 | | 101.3 | 52.6 |
| Potatoes | 0.57 | | | 0.57 |
| Cotton | 5.20 | | 2.18 | 3.69 |
| Oil Seeds | 4.20 | | 27.33 | 15.76 |
| Vegetables | 18.18 | | 2303.0 | 1160.50 |
| Melons, cucumber | 1.63 | | | 1.63 |
| Alfalfa | 12.86 | | | 12.86 |
| Hay | 1285.20 | 861 | 2787 | 1568 |
| Corn | | 7.8 | | 7.8 |
| Dates | | | 292.5 | |
| Sugar cane | | | 6.0 | |
| Grapes | | | 32.0 | |
| Beet | | | 1.02 | |
| | | | 4.2 | |

**Product prices (in rials per kgm.)**

| | | | | |
|---|---|---|---|---|
| Wheat | 6.94 | 6.05 | 6.08 | 6.35 |
| Barley | 4.19 | 3.49 | 3.61 | 3.76 |
| Rice | 17.81 | 17.63 | 17.63 | 17.63 |
| Cotton | | | | 34,70 |
| Pulses | | | | 14.0 |
| Potatoes | | | | 8.85 |

**Total income per farmer exclusive income from fruit trees and farm animals (in rials)**

| | | | | |
|---|---|---|---|---|
| | 9,726 | 5,938 | 20,984 | 12,148 |

Population

No. of khish

Area under cultivation (of wheat, barley and rice) in hectares.

Amount of production of wheat, barley and rice in metric tons.

Yield of each of the above-named products in kilograms per hectare.

The area of a khish in hectares.

Income (in kind) of a farmer in kilograms from each of the above-mentioned products.

Price of the products in rials per kilogram.

Total money value of the farmer's produce of cereals and other agricultural products.

The results of the study can be summarized as follows:

a. Total area under cereal cultivation in Khuzistan (based on the 1957, 1958 and 1960 statistics) averaged 462,293 hectares. This represents 9% of the total area of 5 million hectares under cereal cultivation throughout the whole of Iran.

b. Average annual cereal production was found to be 235,218 tons representing only 6% of the 4 million tons produced in Iran. It is seen therefore that the yield per hectare in Khuzistan is lower than in the rest of the country.

c. Yield per hectare for all Khuzistan, based on the adjusted statistics of the years 1957 and 1958 and 1960, were as follows:

| | | |
|---|---|---|
| Wheat and barley (irrigated) | 668 kgms per | hectare |
| « (dry farming) | 350 | « |
| Rice | 1384 | « |

To enable comparison with the yield figures obtained for the Zanjan Study[1] for the two years 1958 and 1960, it would be necessary to omit the 1957 statistics from the calculations giving the following comparative figures :

| | Khuzistan Kgms. perhectare | Zanjan (kgms. perhectare) |
|---|---|---|
| Wheat and barley (irrig.) | 551 | 904 |
| « (dry) | 252 | 375 |
| Rice | 1401 | 1449 |

d. Average area of a khish (2 men, 2 oxen) was found to be :

| | | | |
|---|---|---|---|
| Wheat and barley (irrig.) | | 2.64 | hectares |
| « (dry) | | 4.85 | « |
| Rice | | 0.39 | « |
| Other products | | 0.18 | « |
| Total | (approx.) | 8 | « |

This appears to be somewhat higher than in other parts of the country and can probably be ascribed to the greater prevalence of horses and mules as draught animals.

e. The average income in kind of the farmer in Khuzistan, after deducting the share of the landlord, works out to:

| | | |
|---|---|---|
| Cereals | 1568 | kgms. |
| Hay | 1568 | « |
| Other products | 2823 | « |

The value of the cereals alone, which provide the bulk of the farmer's income, was calculated at Rls. 11,249.

To enable comparison with the income of the farmer in Zanjan, it would be necessary, as noted under (c) above, to omit the 1957 statistics of the Ministry of Agriculture. This results in a total for Khuzistan of 1073 kgms. of wheat, barley and rice valued at approximately Rls. 7604 against 865 kgms. and Rls. 6253 for Zanjan.

Since the yield per hectare in Zanjan is not less than in Khuzistan, the higher income of the Khuzistan farmer must be due to the greater khish area in Khuzistan (8 hectares v. 5 hectares in Zanjan).

1. See TAHQIQAT É EQTESADI, No. 1 &2.

**The Development of Cereal Production in Khuzistan During the Last 35 Years**

It may not be of place again to note that in view of the incomplete nature of the Ministry of Finance statistics for the years 1926 to 1933 in Khuzistan and the impossibility of comparing them with the statistics of Ministry of Agriculture for 1957 and of the Department General of Statistics for 1958 and 1960 this comparison was made for only 4 districts, namely, Dezful, Behbehan/ Kuhkiloyeh, Shushtar and Ramhormoz. It is submitted that the development of agriculture in these four districts can be considered as representative of the whole of Khuzistan in so far as area under cultivation, yield per hectare, farmer's income, khish area, etc., are concerned.

The following conclusions can be reached from a close study of the agricultural statistics for the four districts:

a) The number of khishes farmed has increased from 17,563 (average 1926 - 1933) to 22,847 (average for the years 1957,1958 and 1960)--- an increase of 30%

b) Khish area has similarly increased from 5.31 hectares to 8.41 hectares— a 58% increase.

c) Area under cereal cultivation has increased from around 94,000 hectares to 193,000 hectares— an increase of 105%. This ties in correctly with the other two increases mentioned above: for the area under cultivation is the product of the number of khishes and the khish area, and

$$1.30 \times 1.58 = 2.05$$

d) Cereals produced rose from 104,000 tons to 134,000 tons—an increase of 28.7% over the last 35 years. This does not tie in with the increase in the area under cultivation and reflects a diminution of the yield per hectare over the years, as shown below:

Compararison of Yield Per Hectare

| | Average 1957,1958,1960 (kgms. per hectare) | Average 1926-1933 (kgms. per hectare) |
|---|---|---|
| Wheat and Barley (irrig.) | 756 | 1210 |
| « (dry) | 516 | 545 |
| Rice | 1727 | 3638 |

The following explanation for this reduction of yield per hectare over the years is suggested:

Yield per hectare of dry farmed cereals has not reduced appreciably because the districts studied (with the exception of Ramhormoz) are all in the more humid region where adequate rainfall has maintained yields. The fall in the yield of irrigated products is very likely due to careless irrigation with mechanical pumps which has caused an increase in the salt content of the top-soil both from increased salt concentration of the river water and from the sub-soil through capillary action.

e. The farmer's income in kind from cereals (his main source of income) has not changed very much, for the reduction in yield per hectare has offset the increase in the khish area. In so far as the money income is concerned however, his income has risen from Rls. 858 (average 1926-1933) to Rls. 18,448 (average 1957, 1958 and 1960). Since the rial has been devalued by 32 times during the period under study,[1] it will be found that the Rls. 858 of 35 years ago was roughly worth 27,468 present - day rials and that the Khuzistan farmer's real income has actually declined by a third.

f. Since the farmer's income in kind has not materially changed over the last 35 years, it must be said that attempts made for agricultural reform in Khuzistan, whether by the government (through legislation, handover of public domains to private enterprise, steps taken for the encouragement of pump irrigation and protection of agriculture) or by the private sector (improved methods of agriculture, etc.) though they may have resulted in increasing the area under cultivation and the amount of production, have not had any material effect on the farmer's income and consequently on his welfare. If the devaluation of the rial is ignored it is found that the farmer receives the same quantity of cereals as he did 35 years ago and lives at much the same level. But when the effect of this devaluation is considered it will be seen that his real income, and consequently his standard of living and welfare, has fallen considerably over the last 35 years.

The lessons to be learnt from the two studies so far undertaken are that so long as our agriculture is carried on with outmoded appliances and

1. See the results of a study on the devaluation of the rial during the last 35 years summarised as a supplement to this paper.

draught animals we must expect to witness productivity retrogression in the Zanjan area and stagnation in the Khuzistan area.

Improvement of the lot of the farmer can only be brought about through increasing soil productivity by scientifically controlled irrigation, pest control, encouragement of intensive agriculture and better use of labour resources aided by mechanized appliances—directions in which no effective steps appear to have been taken in all the reform programs put up throughout the past 35 years.

# APPENDIX I

## VARIATIONS IN THE PURCHASING POWER OF THE RIAL DURING THE 35 YEARS FROM 1926 TO 1961

In the course of our studies on cereal production in Iran and the Iranian peasant's income we have frequently had to compare the real worth of the rial at different periods. It is generally agreed that to compare the purchasing power of money as between different dates it is necessary to compare the indices of prices ruling at those dates. Apart from the difficulties of choice of suitable indices, one of our major difficulties was that there simply were no indices available for the years prior to 1936. We therefore resorted to make use of variations in the price of the gold sovereign for the years prior to 1936. This plan resulted in the following formula:

$$\frac{\text{Index of Prices in 1961}}{\text{Index of prices in 1926}} = \frac{\text{Index of Prices in 1961}}{\text{Index of Prices in 1936}} \times \frac{\text{Price of a gold sovereign in 1936}}{\text{Price of a gold sovereign in 1926}}$$

Data available from Bank Melli statistics have provided the following figures:

Index of prices in 1936= 100

« 1956= 1273

Price of a gold sovereign in 1936= Rls. 80. 50

« 1924= « 32. 00

Applying these data in the formula it was found that the purchasing power of the rial had been reduced 1956 to one thirty-second of its purchasing power in 1924.

This deterioration in purchasing power over the years was considered by a panel of economists of the Institute for Economic Research too high and unrealistic and it was decided that other methods should be sought for the determination of the fall in value of the rial.

The Research Group decided to make use of private documentary sources and for this purpose made extensive use of the household accounts which had been regularly written up by Engineer Shakerin, a member of the Group.

The prices of all items shown in the Bank Melli index of cost of living were extracted from the household lists for the year 1926 and these together with the weights assigned in the Bank Melli index are snown in the Table on page 87.

It will be seen that the household lists give prices for only 17 articles in the basket, and that the prices given are generally higher than those quoted by the Bank Melli, probably due to lack of identity of quality, but most likely due to the Bank's having used wholesale prices rather than retail prices. It was therefore considered advisable to use the household list prices for both 1926 and 1936 in order to smooth out such differences, even though the reduction of the range of articles to only 17 tends to reduce the accuracy. Thus the 1926 index of cost of living on the basis of 1936 can be determined by the application of relevant data in the formula

$$1926 \text{ Index (base year } 1936) = 100 \times \frac{\Sigma q_o p_{36}}{\Sigma q_o p_o}$$

where $q_o$ denote weights
$p_o$ " 1936 prices
$p_{36}$ " 1926 prices

$$\text{Now the 1960 index (base 1936)} = 100 \times \frac{\Sigma q_o p_{60}}{\Sigma q_o p_o}$$

$$\text{Therefore } \frac{\text{1960 index}}{\text{1926 index}} \text{ (both on 1936 base)} = 100 \times \frac{\frac{\Sigma q_o p_{60}}{\Sigma q_o p_o}}{\frac{\Sigma q_o p_{36}}{\Sigma q_o p_o}}$$

$$= \frac{\Sigma q_o p_{60}}{\Sigma q_o p_{36}} = 32.4$$

This agrees very well with the results obtained by the first method of using the prices of the gold sovereign at the two periods and in view of the corroboration found the results are now considered acceptable by the panel of economists of the Institute.

It will be readily seen therefore that the Iranian peasant's income can be considered to have augmented only if his rial income in 1960 can be shown to be at least 32 times his money income in 1926.

Table of Comparative Data for Household Expenditure
(1926 and 1936) (Prices in Rials)

| Articles | Weights ($q_0$) | | 1926 Prices ex Household Lists | 1936 Prices ex Household Lists | 1936 Prices ex Bank melli |
|---|---|---|---|---|---|
| Bread | kg. | 18.5 | 0.80 | — | 0.54 |
| Sugar | « | 8.0 | 3.20 | 4.30 | 4.36 |
| Mutton | « | 7.0 | 2.40 | — | 2.44 |
| Ghee | « | 4.0 | 5.90 | 11.00 | 8.24 |
| Rice | « | 3.3 | 1.50 | 2.00 | 1.65 |
| Tea (Indian) | 100 gm. | 2.5 | 1.96 | 4.00 | 3.49 |
| Turmeric | « | 1.0 | 0.40 | — | 0.75 |
| Pepper | « | 1.0 | 0.93 | — | 0.81 |
| Onions | kg. | 3.0 | 0.32 | 0.41 | 0.40 |
| Cheese | « | 2.0 | 2.80 | 4.00 | 3.15 |
| Flour | « | 0.3 | 0.91 | — | 0.70 |
| Eggs | 10Nos. | 0.8 | 1.30 | 1.20 | 1.17 |
| Yogurt | kg. | 0.3 | 0.63 | — | 0.81 |
| Chicken | No. | 0.3 | 2.25 | 4.00 | 2.75 |
| Cigarettes | 50 Nos. | 2.0 | — | — | 1.60 |
| Rent | Unit | 12.0 | 40.00 | 80.00 | 36.60 |
| Charcoal | kg. | 4.7 | 0.48 | 0.40 | 0.44 |
| Firewood | 100 kg. | 2.6 | 8.30 | — | 17.69 |
| Kerosene | kg. | 2.30 | 1.50 | — | 1.37 |
| Matches | box | 0.4 | 0.45 | — | 0.11 |
| Men's clothing | 3m. | 3.0 | 70.00 | — | 127.71 |
| Men's summer clothing | 3m. | 2.0 | — | — | 71.69 |
| Children's clothing | 2m. | 2.0 | — | — | 75.02 |
| Men's shirting | 10m. | 2.0 | 18.00 | 60.00 | 39.36 |
| Women's clothing | 10m. | 3.0 | 25.00 | 60.00 | 60.91 |
| Socks | pair | 1.5 | 1.40 | 2.50 | 2.12 |
| Leather shoes | « | 3.5 | 20.00 | — | 33.66 |
| Cloth shoes (Guiveh) | « | 1.0 | 7.75 | 13.00 | 13.56 |
| Haircut | Each | 1.5 | 1.05 | 1.10 | 1.29 |
| Soap | 100 gm. | 1.75 | 0.33 | 0.25 | 0.31 |
| Bath | each | 2.75 | 1.30 | 3.00 | 1.80 |

# APPENDIX II

## WHEAT: ITS PRODUCTION AND PRICE[1]

A general outline of the world wheat production and price variations helps towards an understanding of the problems of cereal production in Iran and for this reason the Research Group on Cereals Production give a short summary of the present world position on wheat production and price variations.

### Part I - Production

**Area Under Cultivation:** Although the area under wheat cultivation in the world has been increasing throughout the last 24 years from 169 million hectares (1934-38 average) to 205 million hectares in 1960, yet the area under cultivation in 7 out of 10 principal countries has decreased,[2] has remained stationary in Canada and has increased only in India and Turkey. This would appear to result from increased cultivation in minor wheat producing countries of the world.

The area under cultivation in Iran in the year 1936/37 was 1.7 million hectares,[3] or about 1% of that of the world. This area had increased to 3.7 million hectares, or about 2% of the world by 1960.[4]

**Total Production:** Total world production rose from 167 million tons to 250 million tons over the years.[5] But despite the decrease in the area under cultivation in the above-mentioned countries total production in most of the 10 countries increased as a result of increased yields and only in Italy, Spain and Argentina remained at the same level.

In Iran total production, which was estimated at 2 million tons (or 1.24% of world) in 1936/37[6] rose to only 2.6[7] million tons in 1960 (or 1.03% of world)

**Yield Per Hectare:** Yield per hectare was on the increase in France, Italy, Canada, U. S., Argentina, Australia and India, but remained stationary in Pakistan, Turkey and Spain---see Table. 1.

1- International Wheat Council, «*World Wheat Statistics*», London, 1960, p.12, and U.N., «*1960 Annual Production (FAO)*», vol. 14, p.96.

2- The countries are: U.S., Argentina, Italy. France, Pakistan, Australian and Spain.

3- Ministry of Agriculture, «*Agricultural Statistics For 1937*».

4- Department of Statistics, *Census of Agriculture, 1960*.

5- *World Wheat Statistics*, 1960, p.12, vol.14.

6- N. Falsafi, «*Economic Geography of Iran*» Tehran, 1939.

7- Department of Statistics, *Census of Agriculture*, 1960.

Table 1 - Yield per Hectare in Principal Wheat Producing Countries (1934-1960) (Kgms. Hectare)

| | Average 1934/35 to 1938/39 | Average 1949/50 to 1953/54 | Average 1954/55 to 1958/59 | 1959/60 |
|---|---|---|---|---|
| France | 1560 | 1890 | 2240 | 2600 |
| Italy | 1480 | 1640 | 1800 | 1810 |
| U. S. | 870 | 1130 | 1440 | 1430 |
| Argentina | 980 | 1160 | 1320 | 1330 |
| Canada | 710 | 1380 | 1320 | 1200 |
| Australia | 800 | 1160 | 1200 | 1110 |
| Spain | 960 | 840 | 1030 | 1060 |
| Turkey | 1060 | 1050 | 980 | 1040 |
| Pakistan | 850 | 840 | 780 | 800 |
| India | 690 | 670 | 720 | 790 |

Source: FAO. World Wheat Statistics 1960.

Percentage increases in yields per hectare between the years 1934 and 1960 were as follows:

| | |
|---|---|
| Canada | 70% |
| France | 66% |
| U. S. | 64% |
| Italy | 22% |
| India | 14% |

In Iran, the Census of Agriculture in 1960 showed yields of 870 kilograms per hectare which compare unfavourably with yields of 3000 kgms. in New Zealand, 2920 Kgms. in Holland, 2880 kgms. in Belgium, 2700 kgms. in Denmark, 2600 kgms. in Germany, 2420 kgms in Britain and 2160 kgms. in Japan. But it must be borne in mind that 1960 was a bad year for Iran as regards rainfall.

**Exports:** Exports of the 7 main wheat exporting countries of the world are given in Table 2.

Table 2- Wheat Exports (1954 - 1960)

| | Average 1954/55 to 1958/59 (1000 tons) | 1959/60 (1000 tons) |
|---|---|---|
| U. S. | 937 | 11,317 |
| Canada | 6,776 | 6,586 |
| Australia | 1,737 | 2,596 |
| Argentina | 2,826 | 2,109 |
| France | 1,201 | 1,318 |
| Italy | 404 | 265 |
| Turkey | 316 | 118 |

Source: FAO and International Wheat Council

Imports of the 6 main wheat importing countries of the world are given in Table. 3

Table 3- Wheat Imports (1954 - 1960)

| | Average 1954/55 to 1958/59 (1000 tons) | 1959/60 (1000 tons) |
|---|---|---|
| U. K. | 4657 | 4472 |
| India | 1889 | 3550 |
| Japan | 1544 | 2153 |
| Brazil | 1544 | 2153 |
| West Germany | 2738 | 2059 |
| Pakistan | 452 | 1100 |

Source: FAO and International Wheat Council

(Imports of Iran during the two periods shown in Table 3 were 43,000 and 371,000 tons respectively.)

The United Kingdom has traditionally been the largest importer of wheat. No tariff barriers have been placed against the import of wheat but there is a 10% duty on flour. British production was greatly boosted during the post-war years as a result of the policy of price protection; but since all of the domestic production is of the soft variety it has to be mixed with imported hard wheats for consumption. Government policy has been mainly in the direction of encouraging production for human consumption but since the last 3 years other products such as animal fodder have replace wheat in enjoying subsidies. Despite a reduction in the area under cultivation this country has maintained its wheat production as a result of good seed, suitable climate and adequate use of fertilisers.

In Brazil domestic wheat production has been inadequate to meet local requirements (mainly due to climatic conditions, pests and the competition of other agricultural products). 80% of the requirements have to be imported from Argentina and the U.S.

In Japan demand for wheat has been steadily rising and will probably continue to rise as a result of increases in population rather than increased per capita consumption. Japan supplies a third of her requirements by means of subsidizing domestic production at 50% over and above international prices and the imposition of a stiff tariff on imported wheat. Domestic wheat has traditionally been of the soft variety but demands for hard

wheat have increased of late for bread making, so that half of the imports now are of the hard wheats from Canada and Argentina. Imports from Australia are on the increase.

India is the greatest importer of American wheat, which she pays for in Indian rupees. In 1960 an agreement was signed between the U. S. and India for the delivery of 16 million tons of wheat over a period of 4 years so as to enable India to build up a reserve of 4 million tons and maintain wheat prices.

West Pakistan is a major wheat producing and consuming area. Production is carried on with the aid of ancient ploughs drawn by a pair of oxen or camels and sowing is done by hand. Wheat forms about 80% of the food of the peasant population. Most of the imports are from the U.S. but some white wheat is also imported from Australia and Canada.

Variations in the price of wheat will be dealt with in the next issue.

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